

### **IN THE CLAIMS**

1. (Original) A method of cleaning a semiconductor surface, comprising:  
placing the semiconductor surface in contact with a carrier fluid;  
forming a supercritical fluid adjacent to the semiconductor surface; and  
changing a thermodynamic condition of the supercritical fluid to cause gas bubbles in the carrier fluid.
2. (Original) The method of claim 1, wherein forming a supercritical fluid includes forming a carbon dioxide supercritical fluid.
3. (Original) The method of claim 1, wherein forming a supercritical fluid includes forming a supercritical fluid from a group consisting of nitrous oxide, ethane, ethylene, propane, and xenon.
4. (Original) The method of claim 1, wherein forming a supercritical fluid includes forming a supercritical fluid from a group consisting of ethyl alcohol, ethyl ether and methyl alcohol.
5. (Original) The method of claim 1, wherein placing the semiconductor surface in contact with a carrier fluid includes placing the semiconductor surface in contact with de-ionized water.
6. (Original) The method of claim 1, wherein placing the semiconductor surface in contact with a carrier fluid includes immersing a semiconductor in an acid cleaning solution.
7. (Original) The method of claim 1, further including providing sonic wave energy to the carrier fluid.
8. (Original) The method of claim 1, further including brushing the semiconductor surface.

9. (Original) The method of claim 1, wherein forming a supercritical fluid includes adjusting both a pressure and temperature of a surrounding gas atmosphere to form the supercritical fluid.
10. (Original) The method of claim 1, wherein changing a thermodynamic condition includes changing both a pressure and temperature of the supercritical fluid.
11. (Original) A method of cleaning a semiconductor surface, comprising:
  - placing the semiconductor surface in contact with a carrier fluid;
  - forming a carbon dioxide supercritical fluid adjacent to the semiconductor surface; and
  - changing a thermodynamic condition of the carbon dioxide supercritical fluid to cause gas bubbles in the carrier fluid.
12. (Original) The method of claim 11, wherein placing the semiconductor surface in contact with a carrier fluid includes placing the semiconductor surface in contact with de-ionized water.
13. (Original) The method of claim 11, wherein placing the semiconductor surface in contact with a carrier fluid includes immersing a semiconductor in an acid cleaning solution.
14. (Original) The method of claim 11, further including providing sonic wave energy to the carrier fluid.
15. (Original) The method of claim 11, further including brushing the semiconductor surface.
16. (Original) A method of cleaning a semiconductor surface, comprising:
  - placing the semiconductor surface in contact with a carrier fluid;
  - forming a supercritical fluid adjacent to the semiconductor surface;
  - changing a thermodynamic condition of the supercritical fluid to cause gas bubbles in the

carrier fluid; and

providing supplemental mechanical energy at the semiconductor surface in addition to the gas bubbles.

17. (Original) The method of claim 16, wherein forming a supercritical fluid includes forming a carbon dioxide supercritical fluid.

18. (Original) The method of claim 16, wherein placing the semiconductor surface in contact with a carrier fluid includes placing the semiconductor surface in contact with de-ionized water.

19. (Original) The method of claim 16, wherein placing the semiconductor surface in contact with a carrier fluid includes immersing a semiconductor in an acid cleaning solution.

20. (Original) The method of claim 16, wherein providing supplemental mechanical energy includes providing sonic wave energy to the carrier fluid.

21. (Original) The method of claim 16, wherein providing supplemental mechanical energy includes brushing the semiconductor surface.

22. (Original) A method of cleaning a semiconductor surface, comprising:  
placing the semiconductor surface in contact with a carrier fluid;  
forming a supercritical fluid adjacent to the semiconductor surface;  
changing a thermodynamic condition of the supercritical fluid to cause gas bubbles in the carrier fluid; and  
providing sonic wave energy to the carrier fluid.

23. (Original) The method of claim 22, wherein forming a supercritical fluid includes forming a carbon dioxide supercritical fluid.

24. (Original) The method of claim 22, wherein providing sonic wave energy to the carrier fluid includes providing ultrasonic wave energy to the carrier fluid.

25. (Original) The method of claim 22, wherein providing sonic wave energy to the carrier fluid includes providing megasonic wave energy to the carrier fluid.

26. (Original) A method of cleaning a semiconductor surface, comprising:  
placing the semiconductor surface in contact with a carrier fluid;  
forming a supercritical fluid adjacent to the semiconductor surface;  
changing a thermodynamic condition of the supercritical fluid to cause gas bubbles in the carrier fluid; and  
brushing the semiconductor surface.

27. (Original) The method of claim 26, wherein forming a supercritical fluid includes forming a carbon dioxide supercritical fluid.

28. (Original) The method of claim 26, wherein placing the semiconductor surface in contact with a carrier fluid includes placing the semiconductor surface in contact with de-ionized water.

29. (Original) The method of claim 26, wherein placing the semiconductor surface in contact with a carrier fluid includes immersing a semiconductor in an acid cleaning solution.

30-40 (Cancelled)

41. (Original) A method of cleaning a semiconductor assembly, comprising:  
placing the semiconductor assembly in contact with a carrier fluid;  
forming a supercritical fluid adjacent to the semiconductor surface;  
changing a thermodynamic condition of the supercritical fluid to cause gas bubbles in the carrier fluid.

42. (Original) The method of claim 41, wherein forming a supercritical fluid includes forming a carbon dioxide supercritical fluid.

43. (Original) The method of claim 41, wherein placing the semiconductor assembly surfaces in contact with a carrier fluid includes immersing the semiconductor assembly in a halogenated hydrocarbon fluid.

44. (Original) The method of claim 43, wherein immersing the semiconductor assembly in a halogenated hydrocarbon fluid includes immersing the semiconductor assembly in a chlorocarbon solvent.

45. (Original) The method of claim 43, wherein immersing the semiconductor assembly in a halogenated hydrocarbon fluid includes immersing the semiconductor assembly in a chlorofluorocarbon solvent.

46. (Original) The method of claim 41, further including providing sonic wave energy to the carrier fluid.

47-50 (Cancelled)